M007: MOUNTAINEERING EQUIPMENT

TSP Number/Title	M007: Mountaineering Equipment
Effective Date	Implement next class iteration upon receipt
Supersedes TSP(S)/ Lessons	None
TSP User	The following courses use this TSP: Mountain Instructor Qualification Course (MIQC) Basic Mountaineering Course (BMC) Assault Climber Course (ACC)
Proponent	United States Army Alaska, Northern Warfare Training Center
Improvement Comments	Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: ATTN: TRAINING ADMINISTRATOR COMMANDANT USARAK NWTC 1060 GAFFNEY ROAD#9900 FORT WAINWRIGHT AK 99703-9900
Security Clearance/Access	Public Domain
Foreign Disclosure Restrictions	The Lesson Developer in coordination with the USARAK NWTC foreign disclosure authority has reviewed this lesson. This lesson is releasable to foreign military students from all requesting foreign countries with Approval of Commandant USARAK NWTC.

Purpose

This training support package provides the instructor with a standardized lesson plan for presenting instruction for:

Task Number	Task Title
VIII.0200	Mountaineering Equipment

Technique of Delivery

Lesson Number	Instructional Strategy	Media
M007	Class	None

This TSP contains

SECTION I **ADMINISTRATIVE DATA**

All courses including this lesson

Course Number	Course Title
NA	Mountain Instructor Qualification Course
NA	Basic Mountaineering Course
NA	Assault Climber Course

Task(s) Taught or Supported

Task Number	Task Title
VIII.0200.A-S	Describe the characteristics, care and maintenance of Mountaineering Equipment

Task(s) Reinforced

Task Number	Task Title
N/A	N/A

Test Lesson Number

Hours	Lesson Number	Lesson Title
1	M020/M021/M022	BMC Mountaineering Review/ACC Mountaineering Review/MIQC Mountaineering Review

Prerequisite Lesson(s) M005, Risk Management for Mountain Operations, VI.0200

References

Number	Title	Date	Additional Information
	NWTC Mountain Operations Manual	FY04	Updated yearly
FM 3-97.6	Mountain Operations	November 2000	http://www.adtdl.army.mil/
FM 3-97.61	Military Mountaineering	August 2002	http://www.adtdl.army.mil/

Student Study Assignment	Read TSP M007
Instructor Requirements	MIQC graduate, TAITC graduate
Additional Support Personnel Requirements	None
Equipment Required	Instructor Equipment • Ropes • All other mountaineering equipment needed Student Equipment • Ropes • All issued mountaineering equipment
Materials Required	Instructor Materials: • NWTC Mountain Operations Manual • Risk Management for Mountain Operations Student Materials: • NWTC Mountain Operations Manual • Risk Management for Mountain Operations
Classroom, Training Area and Range Requirements	An area big enough to allow students to lay out and inspect all mountaineering equipment for class.
Ammunition Requirements	None
Instructional Guidance	Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

Branch Safety Manager Approval

NAME	Rank	Position	Date
Mark Gilbertson	**GS-09**	**Training Specialist**	

Proponent Lesson Plan Approvals

NAME	Rank	Position	Date
Peter Smith	**GS-12**	**Training Administrator**	

SECTION II **INTRODUCTION**

Method of instruction: Small Group
Type of instruction: Class
Instructor to student ratio: 1:8
Time of instruction: 2 hours
Media used: None

Motivator

Operations in mountainous terrain cannot always be accomplished without the aid of special equipment. Movement up steep slopes and cliffs, across swift flowing streams, over deep ravines, and over glaciated terrain will often require roped movement in teams, or movement on fixed rope installations to travel safely and quickly. The choice of what equipment to carry depends on mission, terrain, and to some extent - experience. It is important to become totally familiar with all equipment. Inspection, maintenance, and proper use of mountaineering equipment are vital to safe travel.

Terminal Learning Objective

ACTION:	Describe the characteristics, care and maintenance of Mountaineering Equipment
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics, care and maintenance of Mountaineering Equipment IAW the NWTC Mountain Operations Manual.

Safety Requirements

Ensure that students:

- Receive a risk assessment prior to movement to the training area and before practical exercises.
- Have all necessary equipment for the PE's, to include any additional equipment required by the NWTC SOP.
- Have two full canteens and drink adequate water to avoid becoming dehydrated.
- Receive a briefing on the symptoms of heat injury or cold weather injury, as appropriate.

Risk Assessment Level

Determined by instructor

Environmental Considerations

None

Evaluation

You will be evaluated on this during written test as per the NWTC training schedule for this course

Instructional Lead-in

Operations in mountainous terrain often require the use of specialized equipment. Today I will introduce to you the basic equipment you will use in the mountains. I will talk about the uses and characteristics of the equipment and how to inspect and maintain it. It is important for you to become familiar with this equipment as its use will be vital to safe mountain travel.

Operations in mountainous terrain cannot always be accomplished without the aid of special equipment. Movement up steep slopes and cliffs, across swift flowing streams, over deep ravines, and over glaciated terrain will often require roped movement in teams, or movement on fixed rope installations, to travel safely and quickly.

Mountaineering equipment available to the military has changed drastically since WWII. Most all civilian mountaineering equipment is available due to reformed acquisition requirements. The majority of

mountain movements can be performed with a few basic items, while certain movements will require more specialized equipment. Long, multi-pitch climbing on high angle rock, snow or ice may require equipment that in the past was only available commercially. Glaciers present their own peculiar hazards and require special training and equipment to move safely over them.

The choice of what equipment to carry depends on mission, terrain, and to some extent - experience. It is important to become totally familiar with all equipment. Inspection, maintenance, and proper use of mountaineering equipment is an important element of safe travel. Equipment detailed in this chapter is available either through the supply system, or commercially.

SECTION III PRESENTATION

ELO A

ACTION:	Describe the characteristics/maintenance of ropes
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance ropes IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1- Characteristics of ropes

a. A rope is a bundle of fibers that can carry a load. How much depends on the material, type of construction, age, and amount of wear. Originally, climbers used ropes made from natural fibers such as hemp, sisal or manila. During World War II, a product known as perlon was developed in Germany. This product was procured by the US military and re-named nylon; ropes were developed from this strong, lightweight and elastic product. The original nylon ropes were laid ropes. A laid rope, also known as Army Greenline is made of nylon fiber that has been twisted into three strands which are then twisted around each other in a clockwise direction giving it a right-hand lay. (***This rope has been discontinued because of safety concerns, and should never be used in climbing or mountaineering applications.)*** For years the nylon laid rope was the standard, however. Nylon ropes had (and still have) remarkable elasticity – they stretch under load. The original natural fiber ropes did not stretch; this lack of stretch meant a hard, jolting stop to a falling climber, potentially producing serious injury or rope/system failure. The energy applied to the rope by the force of a falling climber is absorbed and dissipated by the stretch of the rope.

b. Today the nylon kernmantle rope is the industry standard. A kernmantle rope is constructed of an inner core (kern) and an outer case (mantle). The kern is made by twisting nylon fibers into a bundle and then laying or twisting the bundles together. The kern is then covered by a woven sheath (mantle). The kern is the main load bearing portion of the rope taking 80-90 % of the total load. The mantle holds the kern together and protects it. It bears approximately 10-20% of the load.

c. The kernmantle rope is the only climbing rope approved by the Union Internationale des Associations d' Alpinisme (UIAA). This organization is the internationally recognized authority in setting standards for climbing equipment. The Comitee Europeen de Normalisation (CEN) is the European group responsible for creating and maintaining equipment standards. ***Any rope used for climbing should have a UIAA or CEN rating.***

d. There are two types of kernmantle ropes, the dynamic rope and the static rope.

1. The ***dynamic rope*** has a kern that is twisted in much the same manner as a laid rope, giving it stretch. This type of rope is used in situations where the rope may be shock loaded. The built in stretch will absorb most of the shock helping to prevent failure. Dynamic ropes are generally offered in lengths of 50-70 meters; they are offered in diameters from 8mm to 11mm.

Much of the information contained in the next section is for information only. If you remember that the rope must UIAA or CEN rated, you will not go wrong.

(a) Most climbing ropes are designed to be used alone. These ropes are referred to as single ropes and are marked with the number 1 on the end of the rope. Double rope systems can be used alone, but are usually used in difficult rock climbing situations where the rock routes wander. Double ropes are marked with a ½ on the end of the rope. Twin rope systems are two single ropes of a small diameter that are treated like one rope; the ropes must be used together and are not rated to be used alone. Twin ropes are marked with a symbol of two overlapping circles on the end of the rope. More information on single, double and twin rope techniques are presented in TSP M012, Roped Climbing. Different diameter ropes are generally used for different applications (Table from Mountaineering: Freedom of the Hills, 7th Edition):

Diameter	***Common Use***
8mm	As part of a twin rope system for rock and ice climbing; ropes must be clipped together
9mm	As part of a double rope system for rock and ice climbing or as a lightweight single rope for glacier travel
10mm	Lightweight single rope for rock and ice climbing and glacier travel
10.5mm	Moderate weight rope for rock and ice climbing and glacier travel
11mm	More durable single rope for rock and ice climbing and glacier travel

(b) The UIAA/CEN requires that certain criteria are met in order for a dynamic climbing rope to receive the UIAA or CEN stamp. Tensile strength ratings are required for UIAA standards but this is NOT the most important rating. Tensile strength for a single climbing rope generally ranges from 7,000 – 9000 pounds. Before we get into the specific criteria that must be met for UIAA/CEN approval, we must define some terms (all of this information is directly from Freedom of the Hills):

- ***Static Force:*** Imagine that a 10 pound object is attached to a rope; then imagine grasping the rope a few feet from the object in order to hold the object up off the floor. Gravity exerts a downward force on the object while you exert an equal and opposite force to hold it up. The force that gravity exerts on an object is known as weight. The force you exert to hold the object up is static force.

- ***Impact Force:*** Now imagine this variation. While holding your arm still and gripping the rope tightly, have someone lift up the object and drop it. Gravity will cause the object to fall with an acceleration rate of 32 feet per second (9.8 meters) for every second it falls. When the rope you are holding arrests the object's fall, the sudden impact force generated will be much greater than the force of the object's weight when you were merely holding the object up against gravity. Catching the weight of this falling object obviously involves much higher forces than just holding a static weight because the amount of energy generated in a fall goes up dramatically as the falling object accelerates. Impact forces are rated in kilonewtons (kN), a measure of force. One kilonewton of force is roughly equal to about 225 pounds (102 kilograms) of static weight – remember weight is a measure of force. The human body cannot withstand more than about 12 kN, which is equivalent to 2,700 pounds (1,200 kilograms)- or roughly 15 times the weight of the human body – for a brief instant without risk of severe injury.

- ***Length of the fall:*** The force required to catch the object's weight also depends upon how quickly its fall is arrested. It takes much more resistance to stop the weight quickly than if the rope is allowed to slip a bit. Similarly holding the weight of a stationary object involves relatively small forces, but a falling object quickly generates much greater energy. Stopping a fall as quickly as possible will subject every component of the system (including a falling climber attached to the rope), to dangerously high impact forces. There needs to be some way to safely absorb the energy generated by the falling object. Modern

dynamic climbing ropes prevent such dangerously high impact forces by stretching to absorb energy. In the days of hemp ropes, the golden rule of catching a fall was “the rope must run”. That was because the rope had neither the strength to withstand high impact forces nor the shock absorption to avoid injuring the climber. The only safe way to stop a fall was by allowing some rope to slip through. This worked, but was difficult to learn and could injure the person trying to stop the fall. Rope stretch allows for a soft catch. In situations where falls are expected, the dynamic rope is rated not by tensile strength but rather by impact force. This is because a rope does more than simply not break under the impact of a falling climber, it also stretches to absorb that energy. With these definitions in mind we can look at the tests required for a UIAA/CEN rated single dynamic mountaineering rope:

- ***Static elongation test:*** under a load of 80 kg the rope stretch must be less than or equal to 10%.
- ***Sheath slippage test:*** a discussion of this test is beyond the scope of this text but the measurement is in millimeters and must be less than or equal to 20mm of sheath slippage.
- ***Fall test:*** An 80 kg weight is attached to a length of rope. A 2.5 meter length of rope is then run through a fixed carabiner with a radius of 5mm. The rope is then attached to another fixed point that is off-set and below the fixed carabiner. The 80 kg weight is raised 2.3 meters above the carabiner and dropped. The rope must survive a minimum of five falls with an 80 kg weight attached to the end of the rope; forces in each fall must be less than or equal to 12kN. Manufacturers must give the number of falls the rope will withstand and the maximum impact forces generated during the test.

More specific criteria for these tests can be found in the UIAA standards.

2. A ***static rope*** has a kern that is laid straight, giving it little stretch. This rope is used when there is a constant high load, in rappelling, hauling or rescue situations. The mantle is also more resistant to abrasion making it stiffer than the dynamic rope. These ropes also vary in diameter from 8mm-13mm. They should never be used in situations where the rope will be shock loaded.

e. Kernmantle ropes between 5mm and 7mm are called cordalette. While the construction is the same the applications are different. Kernmantle ropes smaller than 4mm are accessory cord and are not to be used for climbing. You will learn more about this in later classes.

Learning Step/Activity 2- Care of ropes

a. The following general rules should ALWAYS be observed when handling rope.

1. The rope should not be stepped on, or dragged on the ground unnecessarily. Small particles of dirt will be ground between the strands and slowly cut them.

2. The rope should never come in contact with sharp edges of any type. Nylon is easily cut, especially when under tension. If a rope must be used on an edge, which could damage the rope, then the edge must be padded.

3. Keep the rope dry as much as possible. If it should become wet, hang it in large loops, above the ground, and allow it to dry. A rope should never be dried out close to an open flame or other high heat source. A wet or frozen nylon rope may lose 10-20% of its original strength.

4. Never leave a rope knotted or tightly stretched for longer than necessary.

5. Never allow a moving rope to rub against a non-moving rope. The stationary rope will become extremely weak or may be cut from the friction produced continually over one spot on the rope. This is especially important when the stationary rope is under tension.

6. Climbing ropes should never be spliced since the handling characteristics will not be acceptable at the point of the splice and rope strength will be greatly reduced.

7. For rope length reference, mark all climbing ropes at their midpoints. This will help in determining remaining rope length in later installations. Use cotton or first aid tape or a rope manufacturer’s recommended marker designed for rope marking.

8. The rope should not be marked with paints or allowed to come in contact with oils or petroleum products as some of these products will weaken it. Acids do the worst damage to a nylon rope. Care must be taken when stowing a rope in a vehicle. Never place the rope near a battery or where a battery has previously been.

9. A climbing rope should never be used for any purpose except mountaineering.

10. New ropes ends are normally fused, but an older rope or a fresh cut rope may need protecting. The end strands can be melted together with heat or a flame, ensure the ends of the core strands fuse with the end of the sheath. Another method is to tape the end first, this will prevent unraveling while cutting. Use the following procedure:

-Place one inch of tape tightly on the end
-Cleanly cut 1/2 inch from the end of the tape
-Melt end, fusing all strands together

11. Using a mild soap and lukewarm water, after which they should be rinsed thoroughly, can wash nylon ropes. Never use a harsh soap or bleach.

12. When not in use, ropes should be coiled and can be hung on wooden pegs or plastic hangers, rather than on nails or any other metal object, or placed in or on clean storage shelves. Keep ropes away from high temperatures and direct sun, (when being stored)

13. Ultraviolet radiation (sun light) will deteriorate nylon over a period of time. This becomes important if rope installations are left in place over a number of months, especially at high elevations where UV rays are stronger. Noticeable color fading or a bleached appearance is a good indicator that ultraviolet rays are deteriorating the rope. A stiff feel is another sign of deterioration. This deterioration is not just in appearance but in strength also.

14. When in areas of loose rock, the rope must be inspected frequently for cuts, abrasions, or other signs of impact from falling rocks.

15. The rope should be inspected prior to each use for frays, cuts, excessive wear and weak spots. The following is a general guideline for determining serviceability:

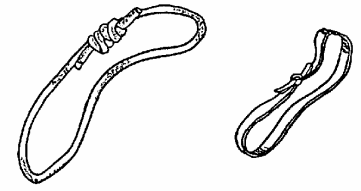
(a) Discard if outer sheath is worn, exposing the inner core strands
(b) Discard if smaller cuts are numerous, or there is extensive fraying along the entire rope
(c) Discard if the rope can be pinched, or has a flat spot more than one-half the rope's original diameter (possible core damage)
(d) Discard after a serious leader fall (20ft or more)

NOTE: Strengths of webbing and kernmantle rope can vary from manufacturer to manufacture. Service life of a climbing rope is a controversial subject. While a given rope might be deemed unsafe for holding a severe fall, it might be regarded as safe to use for rappels or as a hand line in a stream crossing. Try to use common sense. The rule "when in doubt - throw it out" cannot be overemphasized. Remember, the climbing rope is your LIFELINE!

ELO B

Action:	Describe the characteristics and maintenance of sling material
Condition:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
Standard:	Describe the characteristics and maintenance of sling material IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Slings and Sling Material



Rope **Webbing**

a. A sling is a length of rope or webbing and used in many applications. Normally sling material is purchased in spools and cut to the desired length. Rope slings can vary in length and diameter depending on the intended use. Retired climbing ropes are often cut into slings, which are used to construct harnesses and equipment racks. Smaller diameter rope (5-6 mm) is primarily used for prussik slings. Dynamic kernmantle works best as a rope sling material in most applications.

b. Slings made from nylon webbing are preferred over rope slings due to the abrasion resistance of webbing. Webbing is also less bulky and is preferred when many runners are needed. Webbing is constructed in two ways- flat and tubular. Tubular webbing is stronger due to its double thickness and more flexible than flat webbing of the same diameter.

1. Material- nylon

2. Tensile strength 4500 lbs 1inch, 2400 lbs 9/16 inch

3. Length- spools of various length.

4. Diameter- 9/16 up to 2 in.

5. Stretch- 5-15%

Learning Step Activity 2 - Care of Webbing

a. Care of nylon webbing is the same as for nylon rope, however; the ends of a webbing sling need only to be melted to eliminate fraying. The following general rules apply when determining serviceability of nylon webbing:

1. Discard if webbing has any cuts.

2. Discard if a hole wears through either side.

3. Discard if excessively frayed - again use common sense.

SLING MATERIAL and SIZE	***AMOUNT PER PERSON***	***USE ****
Rope 11 mm X 16 ft	2	standard Army rappel seat; A-frame construction; equipment rack; carry rope-suspension traverse
Rope 8mm X 20 ft	1	standard length cordelette
Rope 6 or 7mm X 12 ft	1	stabilizing rope for suspension traverse; long sling or prussik sling
Rope 6 or 7mm X 6 ft	1	Short sling; short prussik
Webbing 1" X 25 ft	1	improvised seat harness; slinging natural anchors; equalizing anchors
Webbing 1" X 9 1/2 ft	2	double length runner;; slinging natural anchors; equalizing anchors; improvised chest harness
Webbing 1" X 5 1/2 ft	2	standard length runner; slinging natural anchors;
Webbing 9/16" X 9 1/2 ft	2	wrist leash for ice ax; double length runner
Webbing 9/16 " X 5 1/2 ft	2	standard length runner

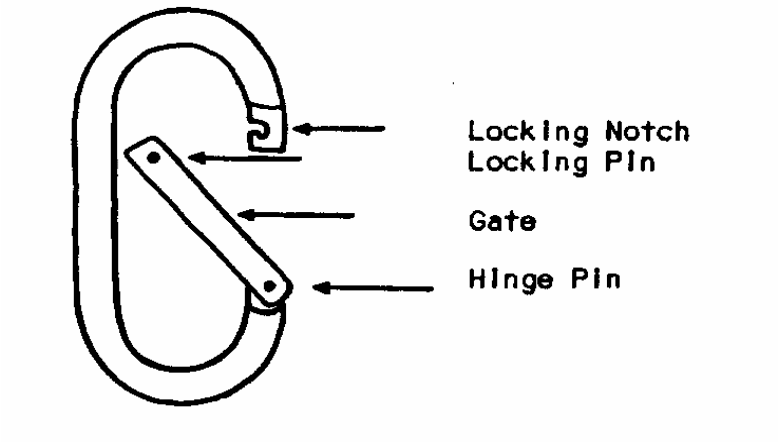
b. An unserviceable length of sling material can be re-used by cutting at the damaged section or removing the damaged section and connecting the “new ends” with the appropriate knot. This adds another knot to the material but recycles it for use again.

c. While sling material can be cut to any desired length, the standard lengths will fit most applications in general mountaineering and glacier travel. Remember, these materials and sizes can have numerous applications, not restrictions to these suggested uses.

ELO C

ACTION:	Describe the characteristics and maintenance of carabiners
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of carabiners IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1- Carabiners



a. The term snap link is "military slang" for an item named a carabiner. The carabiner is used to attach everything used in climbing when a knot is not appropriate: rope to an anchor, anchors to slings, protection to gear sling, etc. It can also be used as a friction device for rappelling and belaying. One side of the carabiner contains a hinged, spring-loaded gate for insertion of the rope or other items.

b. The standard carabiner used by the military since WWII is constructed of steel, is oval in shape, and was originally tested to a "minimum" tensile strength of 2000 lbs. Most carabiners on the market today are constructed of aluminum alloys to reduce weight, and have an approximate tensile strength of 4000 lbs, or more depending on design. Though heavier, the original military carabiners are not as strong as today's aluminum carabiners. However, many steel carabiners are in use today, but these are much larger than the original military steel carabiners and are stronger than "aluminums" of the same size. These are used primarily for rescue installations. Aluminum carabiners can wear out relatively quick under the high heat generated in long rappels or raising and lowering systems.

c. When many carabiners are needed during a climb, it is much easier to carry a large quantity of "aluminums" (aluminum carabiners) because of the reduced weight.

d. Oval-shaped steel carabiners (military type) are still the most versatile with the strength of 2000 lbs.

e. While oval-shaped carabiners are still the most versatile, "D" shaped carabiners allow the solid side, opposite the gate, to absorb more of the load, and are therefore stronger in design. Some carabiners also incorporate a knurled locking sleeve. When in the closed position, the locking sleeve will prevent the gate from opening. Both locking "D" shaped and non-locking "D" shaped carabiners are available. Both have an approximate tensile strength of 5000 lbs.

f. A pear-shaped carabiner, often referred to as a "pearabiner" is available commercially and is designed for use with the "Munter Hitch" belay technique, although it can be used just as any other carabiner. Approximate tensile strength is 4000 lbs.

g. The large steel locking "D" carabiner is often used for rescues and hoisting operations. The tensile strength of this carabineer is approximately 9000 lbs.

h. DO NOT mark carabiners with an engraver; this removes a small portion of metal that is used to

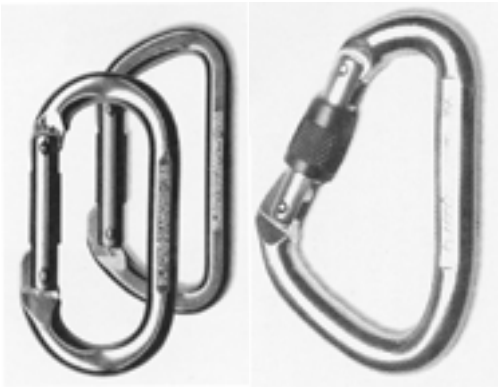
give the carabiner its rated strength - use colored tape but not on the gate or locking sleeve, or use small dabs of paint sparingly. When the tape comes off from wear it remain visible in the environment for some time; when paint falls off, it will be in tiny chips or flakes and disappear into the environment.

i. To inspect the serviceability of any carabiner:

1. With the gate open, check for side play in the gate. Discard if side play exceeds half the thickness of the carabiner. The weakest part of any carabiner is the gate. Check that the gate opens freely and snaps shut. If lube is required, use a very small amount of graphite or even vegetable oil. Petroleum based lube will contact ropes and cause premature rot.

2. Check the locking pin and notch. If either is missing or deformed, discard the carabiner.

3. Check for burrs, cracks or bends. Small burrs can be removed with light sandpaper. Large burrs render the carabiner unserviceable as do bends and cracks.



Carabiners and Locking Pearabiner

ELO D

ACTION:	Describe the characteristics/maintenance of ice axes
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of axes IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Ice Axes

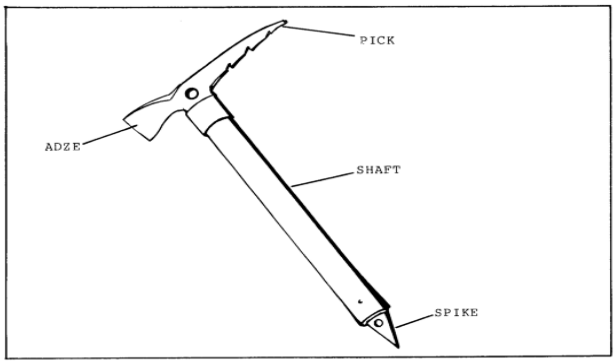


Figure 8-1. Ice axe.

a. Next to the climbing rope the ice ax is probably the most versatile tool for mixed alpine climbing. Proficiency with an ice ax is essential for climbing steep ice and snow-covered slopes and for safe glacier travel. Some like to use the ice ax as a third point of contact on snow-free terrain. Modern axes can be found in many different lengths and head configurations; each design is intended for a more specific use.

b. For years the long 90cm wooden-shaft ice ax was used by the military. Although supply stocks of these older axes have mostly depleted, ice axes are currently ordered commercially. The 70cm length is more common now, bringing more versatility and stows easier due to its shorter length.

c. An ice ax designed for general-purpose mountaineering is best for military-style climbing and glacier travel. Ax head design should feature the standard adze and curved pick. Shaft length should be between 70-80cm. Some of these axes come with a leash from the factory, however, if the ax has a “glide ring,” replace this with a full-length leash, it will be stronger and more useful. There are axes made for climbing steeper angle ice, primarily waterfall ice. These axes are normally used with reverse curved picks used for hooking over bulges or cauliflowers and this type pick is easier to remove once inserted into the ice. Waterfall ice tools are a benefit but not absolutely necessary for vertical ice. The curved shaft of this tool will assist with hand comfort and finger clearance when reaching over bulges.

d. Most axes used in general mountaineering come with the adze and pick permanently mounted while others have modular heads. The adze and pick can be replaced or changed for other shapes and counter weights can sometimes be mounted. The available configurations for these axes come at

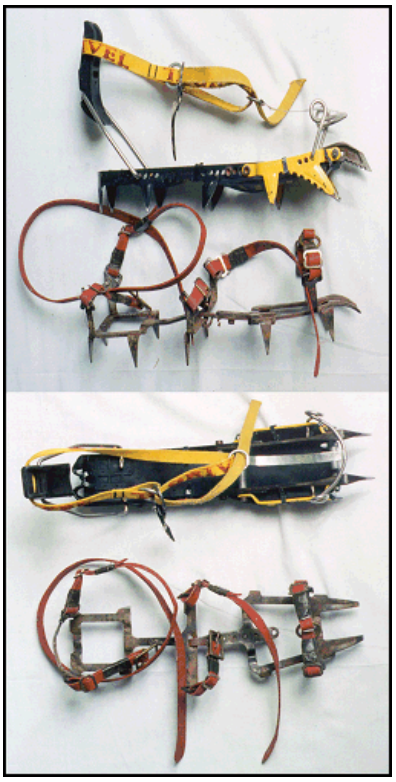
a price, though; the weight is most always more than the typical alpine ax.

e. Inspection and Care: The ice axe should be inspected for loose rivets, cracks, burrs, and any other deformities that may impair its strength or function. If any cracks, bends, or loose parts appear on the ice axe, it should be turned in for a new one. A file can be used to remove burrs and sharpen the head and spike. Steel wool can be rubbed on the metal surfaces to remove rust. All points should be kept sharp and covered when not in use.

ELO E

ACTION:	Describe the characteristics/maintenance of crampons
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of crampons IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1-Crampons



a. Crampons are devices worn over boots to provide firm footing on ice or hard snow. They consist of light metal frames normally with 10-12 points protruding from the bottom or front. Crampon mounting systems are varied, but all use either a strap system or a clamping system or a combination of both. The strap mounts are most useful as the boot type or size is of little consequence to the fit. The clamping system consists of steel bails that fit horizontally into specific grooves in the toe and heel of the mountain boots. These type crampons will have the tightest fit and provide the best precision for vertical ice climbing. With this precise fit come a few limitations: all clamp type crampons do not fit all mountaineering boots without modification and this type crampon will not remain on any boot other than boots manufactured specifically to use this type crampon.

b. Most crampons used for lower angle snow and ice will mount with a strap system. A double strap system is sometimes used although the single continuous strap is simpler. Nylon or neoprene straps are more common now than the previously used leather straps and tend to stay tighter when wet than do

leather straps.

c. Before use, insure boot to crampon fit is perfect. If necessary, adjust the shape of the bails to match the shape of the grooves at the toe and heel of the boots. An incorrect match in this area could result of in loss of a crampon at a critical time. Ensure the strap(s) work correctly before you need to use the crampons. Locate buckles to the outside to prevent snagging on boot/clothing. Trousers should be bloused to prevent catching on crampons.

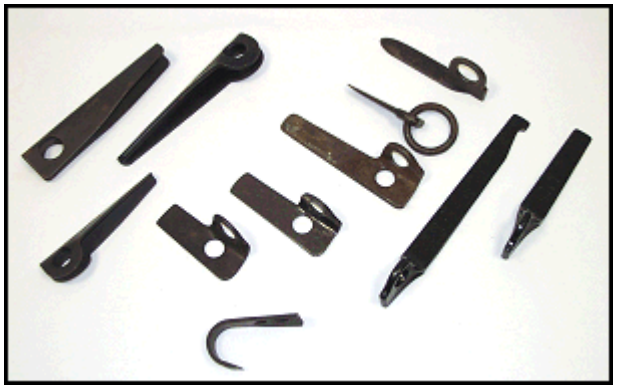
d. Walking in crampons is not complicated but it does present difficulties. When walking on crampons, the same principles are used as in mountain walking, except that when a leg is advanced it is swung in a slight arc around the stationary foot to avoid locking the crampons or catching them in clothing or flesh. The trousers should be bloused to prevent catching on crampons. If the straps are not fully secured, they can become snagged and cause a fall. The buckles should be located on the outside of each foot when the crampons are secured to prevent snagging. Remember, when the crampon snags on the pants or boots, a tear or cut might be the least damage that can occur.

e. Inspection and Care: Make sure all straps are in good condition and try to keep them dry as possible. Keep the points sharp and have a protective cover on them when not wearing them.

ELO F

ACTION:	Describe the characteristics/maintenance of pitons
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of various items of mountaineering equipment, to include ropes, sling material, and hardware IAW the NWTC Mountain Operations Manual.

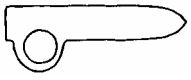
Learning Step/Activity 1- Pitons



a. A piton is a metal spike, which is driven into a crack in the rock to provide a secure anchor. They can be used to anchor fixed rope installations and to protect or aid a team on a difficult climb. Pitons come in two types of metal. One type is soft and malleable and the other is made of hard steel (high-strength chrome-molybdenum steel.)

1. The standard pitons used by the military since WWII are made of a malleable steel and are referred to as "soft-iron pitons". When driven into the rock they will bend and conform to the shape of the crack. Soft-iron pitons come in four different shapes for use in various cracks:

(a) Vertical: Used in flush vertical cracks.



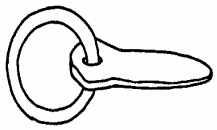
Vertical Piton

(b) Horizontal: Used in all flush or offset horizontal cracks. This piton can also be used in place of the

vertical piton in vertical cracks.

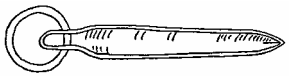
Horizontal Piton

(c) Wafer: Used in shallow flush cracks, horizontal or vertical.



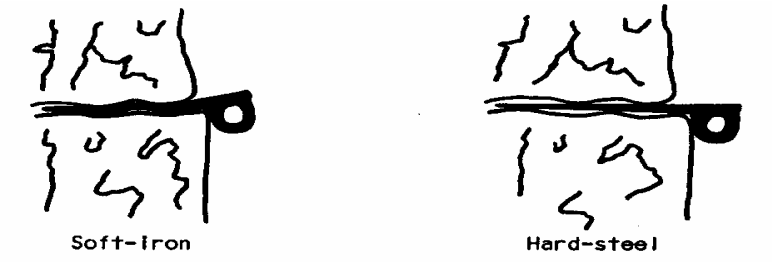
Wafer

(d) Angle: Used in wide cracks, flush or offset horizontal or vertical. Maximum strength is attained only when the legs of the angle are in contact with the same side of the crack.



Angle Piton

b. When properly placed in solid rock, soft-iron pitons will withstand a load from several hundred pounds, (Wafer), to approximately 2000 lbs (Angle). Soft-iron pitons were designed to be used one or two times or driven and left behind. In the training environment they can be re-used with close examination after each use.



c. The other type of piton is the hard steel piton:

1. These pitons are constructed from high-strength chrome-molybdenum steel. They are much stronger than soft-iron pitons and are designed to last longer and be re-used more often. Where the soft-iron piton gets its holding strength by conforming to the shape of the crack, the hard steel; piton gets its holding strength by its rigid stiffness. Protrusions and disconformities in the crack bite down on the hard steel piton and hold it in place.

(a) Angles- These angles differ from the soft-iron version in that the eye is structurally part of the

piton. Used in larger horizontal or vertical cracks.

Angle Lost Arrow Bugaboo Knifeblade Z Piton

Hard Steel Pitons

(b) Lost Arrow- These pitons are horizontals designed to give maximum strength and minimum weight. They can also be used in place of verticals.

(c) Bugaboo- These pitons have a right angle fold in the shaft and are used to span cracks between the normal angle and lost arrow size cracks

(d) Knifeblade- Designed for use in thin cracks, either vertical or horizontal. An extra hole has been placed in them to reduce weight but the offset eye should be used to clip into.

(e) Z Piton- This piton is bent into a Z shape giving it more points of contact when used correctly; this piton can be stacked with other pitons easily. When properly placed in solid rock, hard steel pitons are designed to withstand a load of 4000 lbs or more.

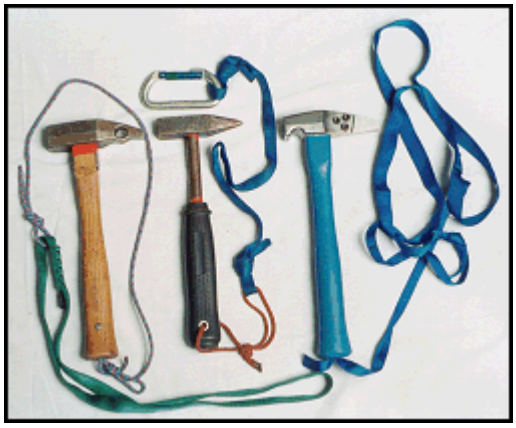
Learning Step/Activity 2- Maintenance

a. Check for cracks or flaws in the metal. If any are present DISCARD IT!

b. These pitons are not designed to bend. Chrome-moly pitons that are bent should be DISCARDED!

Learning Step/Activity 3 - Piton Hammer

a. Pitons are driven into a crack with a hammer. The standard piton hammer in use by the military has a steel head, wooden or metal handle, and a leather thong for attaching it to the climber. One end of the head is used for testing the rock and driving the piton. The other end is pointed for cleaning out rotten rock, dirt or moss from cracks.



ELO G

ACTION:	Describe the characteristics/maintenance of chocks
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of chocks IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1-Chocks

a. In its simplest form, a chock is a stone, which has become wedged in a crack. When a sling can be threaded around one of these chock stones it may provide an excellent anchor and eliminate the need for other types of protection. The speed and simplicity of slinging chock stones for protection brought about the development of artificial chocks. “Chocks” is a generic term used to describe the various types of artificial protection other than bolts or pitons. Chocks are essentially a tapered metal wedge constructed in various sizes to fit different sized openings in the rock. The design of the chock will determine whether it fits into one of two categories – wedges or cams. A wedge holds by wedging into a constriction in the rock. A cam holds by slightly rotating in a crack, creating a camming action that lodges the chock into place. There are passive chocks and active chocks, the difference being the camming effect of either the design of the device or the placement method. One of the chocks that falls into the category of both a wedge and a cam is the hexagonal shaped or “hex” chock. This type of chock is versatile and comes with either a cable loop or is tied with cordallette. All chocks come in different sizes to fit varying widths of cracks. Most chocks come with a wire loop that is stronger than cord and allows for easy placement. The cord used for chocks is designed to be stiffer and stronger than regular cord. The advantages of using chocks rather than pitons, is that a climber can carry various sizes and use them repeatedly.

Wired stoppers

Hexes

Learning Step/Activity 2 -Inspection and Care:

a. Chocks and related hardware should be inspected before, during, and after use to ensure serviceability. All metal surfaces should be smooth and free of rust, corrosion, dirt, and moisture. Burrs, chips, and rough spots should be filed smooth and wire-brushed or rubbed clean with steel wool. Items that are cracked or warped indicate excessive wear and should be discarded. Cord or webbing loops should be inspected for serviceability. When not in use, chocks should be stored in a cool, dry area.

ELO H

ACTION:	Describe the characteristics/maintenance of SLCD's (spring loaded camming devices)
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of SLCD's IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1-Spring Loaded Camming Devices

a. One type of chock that has become very popular with the mountaineering community is the Spring Loaded Camming Device (SLCD). It is a very versatile chock due to its size range for each particular model and is often the only type that will work in parallel or flaring cracks. There are a variety of SLCD's on the market, all-working on the same principle. Usually, three or four metal cams are connected with springs and cable to a lever. When the lever is pulled, the cams contract, allowing the device to be inserted into the crack. When the lever is released, the cams expand. A pull on the shaft of the SLCD will check the position. A short sling or runner should be attached to all SLCD's prior to use.

Learning Step/Activity 2 – Inspection and Care

a. Inspection and Care: Chocks and related hardware should be inspected before, during, and after use to ensure serviceability. All metal surfaces should be smooth and free of rust, corrosion, dirt, and moisture. Burrs, chips, and rough spots should be filed smooth and wire-brushed or rubbed clean with steel wool. Items that are cracked or warped indicate excessive wear and should be discarded. Moving parts should move freely; lubricate them with a manufacturer recommended lubricant (generally a graphite spray) if needed. Wires should be smooth with no broken strands. Cord or webbing loops should be inspected for serviceability. When not in use, chocks should be stored in a cool, dry area.

ELO I

Action:	Describe the characteristics/maintenance of figure eight descenders
Condition:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
Standard:	Describe the characteristics and maintenance figure eight descenders IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1- Figure Eight Descenders

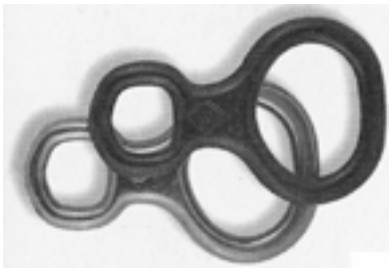


Figure Eight Descender

a. The figure eight is a device, which offers a very safe alternative to the standard military rappel technique (carabiner-wrap). It is especially useful when rappelling on kernmantle rope as this rope type kinks and tangles horribly in the carabiner-wrap rappel. A figure eight can also be used as a very safe mechanical belay device.

ELO J

ACTION:	Describe the characteristics/maintenance of belay devices
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of belay devices IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Tuber type devices

Assorted Tuber Type Belay/Rappel Devices

a. Belay devices range from using equipment at hand (carabiner with a Munter Hitch) to high tech metal alloy pieces of equipment. Regardless of the belay device chosen, the basic principal remains the same – friction around or through the belay device controls the rope's movement. Belay devices are divided into three categories: the slot, the tuber, and the mechanical camming device.

1. The slot is a piece of equipment that attaches to a locking carabiner in the harness; a bight of rope slides through the slot and into the carabiner for the belay. The most common slot type belay device is the Sticht plate.
2. The tuber is used exactly like the slot but its shape is more like a cone or tube.
3. The mechanical camming device is a manufactured piece of equipment that attaches to the harness with a locking carabiner. The rope is routed through this device so that when force is applied the rope cams into a position that prevents further movement of the rope.

ELO K	**ACTION:**	Describe the characteristics/maintenance of mechanical ascenders and rescue pulleys
	CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
	STANDARD:	Describe the characteristics and maintenance of mechanical ascenders and rescue pulleys IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1- Mechanical ascenders

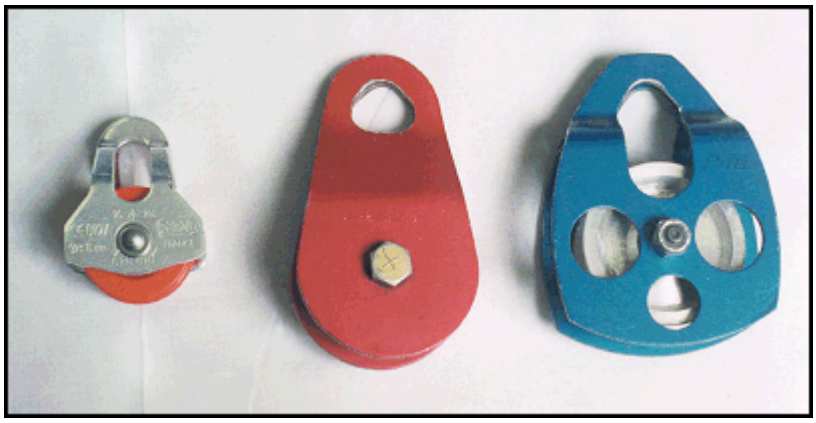
Left hand and Right hand Ascenders

a. An ascender is a mechanical friction device. It consists of a metal framework and a spring-loaded cam and can be used in place of a prussik knot. When placed on a rope it will slide easily in one direction and grip the rope when pulled in the opposite direction. A sling or aider (etrier) attachment allows a climber to easily ascend a fixed line, as in direct aid and crevasse rescue. An ascender is best used in military style climbing as a self-belay device on various fixed rope installations. For use in traverses, a carabiner can be placed around the rope and through the hole at the back of the handle. This will assure a more parallel connection from the ascender to the rope.

Learning Step/Activity 2- Inspection and Care

a. Chocks and related hardware should be inspected before, during, and after use to ensure serviceability. All metal surfaces should be smooth and free of rust, corrosion, dirt, and moisture. Burrs, chips, and rough spots should be filed smooth and wire-brushed or rubbed clean with steel wool. Items that are cracked or warped indicate excessive wear and should be discarded. Moving parts should move freely; lubricate them if needed. Wires should be smooth with no broken strands. Cord or webbing loops should be inspected for serviceability. When not in use, chocks should be stored in a cool, dry area.

Learning Step/Activity 3 - Rescue Pulleys



a. Pulleys are a great aid in some rope installations. Its primary use is with raising or lowering systems and with the "Z"- pulley hauling system where it reduces friction and greatly increases the ease of raising a load. Pulleys come in a variety of sizes and shapes and some with accessories attached such as an ascender. A prussik minding pulley is designed so a prussik knot will not pass through the housing, useful in hauling and crevasse rescue systems. Some pulleys are constructed large enough to allow knots to pass through facilitating use of connected ropes for increased raising and lowering. The stronger pulleys will have a metal wheel instead of plastic.

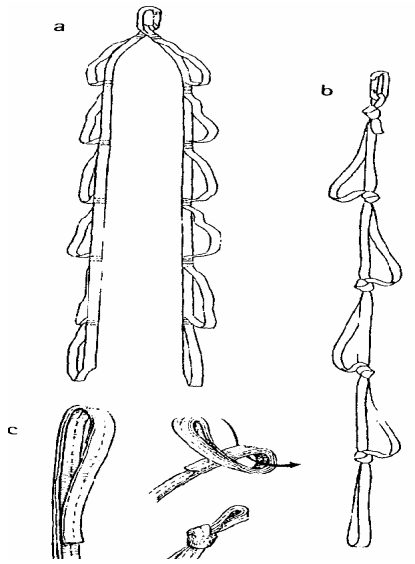
Learning Step/ Activity 4- Inspection and Care:

a. Chocks and related hardware should be inspected before, during, and after use to ensure serviceability. All metal surfaces should be smooth and free of rust, corrosion, dirt, and moisture. Burrs, chips, and rough spots should be filed smooth and wire-brushed or rubbed clean with steel wool. Items that are cracked or warped indicate excessive wear and should be discarded. Moving parts should move freely; lubricate them if needed. Wires should be smooth with no broken strands. Cord or webbing loops should be inspected for serviceability. When not in use, chocks should be stored in a cool, dry area.

ELO L

ACTION:	Describe the characteristics/maintenance of aiders / etriers
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of aiders IAW the NWTC Mountain Operations Manual.

Learning Step/ Activity 1- Aiders / Etriers



a. Etriers are ladder-like slings; it works when the etriers is hooked into a piton or other aid then the climber can climb up place another aid in and does the same. As you can tell a minimum of 2 etriers are needed.

b. You can get the pre sewn ones or can make them your self with 1” tubular nylon webbing. If you make your own and you want an etrier that is 60” long then you will need 170 “of material, this is double the length plus 10”. You will tie a double overhand knot at the top leaving enough space in the loop to hook a carabineer to and minimum of 3” tail. Then every app. 10” tie and overhand knot insuring you leave about 4 to 6 “ for the foot loop and alternate the side the foot loops will be on.

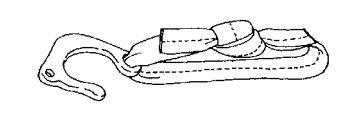
Learning Step/ Activity 2-Inspection and Care**:**

a. You care for these the same as you would tubular nylon webbing. If pre sewn check stitching. If home made check knots and untie when not in use.

ELO M

ACTION:	Describe the characteristics/maintenance of Fifi hooks and cliffhangers
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of Fifi hooks and cliffhangers IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1- Fifi Hooks



a. Fifi hooks function somewhat like daisy chains but are attached to your harness with a sling only 2“long. You can quickly hook in to an aid piece, allowing you to rest and putting the weight on your harness. If you release the tension or change the angle it could unhook.

Learning Step/Activity2 - Inspection and Care:

a. Check the hook as if you were checking a figure eight. Care for the webbing as you would tubular nylon webbing, and check the knots

Learning Step/Activity 3 - Cliffhanger/Skyhooks

a. This item is primarily used for direct aid climbing. It is designed to be hooked over tiny rock nubbins, ledges or flakes. With a sling or etrier (stirrup) attached, it can be used to aid a climber up a difficult section of rock. It should only be used when the direction of pull is straight downward. Keen judgment is required when placing a cliffhanger. Its use appears to be somewhat limited for most military style climbing.

Learning Step/Activity 4 - Inspection and Care:

a. Check the hook as if you were checking a figure eight. Care for the webbing as you would tubular nylon webbing, and check the knots

Cliffhanger

ELO N

ACTION:	Describe the characteristics/maintenance of bolts and hangers
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of bolts and hangers IAW the NWTC Mountain Operations Manual.

Learning Step/Activity - 1 Bolts and Hangers

Bolt Hangar and Bolts

a. These are screw-like shafts made from metal that are drilled into rock to provide support. Two types are: contraction bolts that are squeezed together when driven into a rock; and expansion bolts that press around a surrounding sleeve to form a snug fit into a rock. Bolts require drilling a hole into a rock, which is time-consuming and exhausting to emplace. Once emplaced, bolts are the most secure protection for an omni directional pull. Bolts should be used only when chocks and pitons cannot be emplaced. A bolt is hammered only when it is the nail or self-driving type. The hanger (for carabiner attachment) and nut are placed on the bolt. The bolt is then inserted and driven into the hole. Because of this requirement, a hand drill must be carried in addition to a piton hammer. Hand drills (also called star drills, which describe the drill bit) are available in different sizes, brands, and weights. A hand drill should have a lanyard to prevent loss. Self-driving bolts are quicker and easier to emplace. These require a hammer, bolt driver, and drilling anchor, which are driven into the rock. A bolt and carrier are then secured to the emplaced drilling anchor. The noise of constant hammering may give away ones position in a tactical setting.

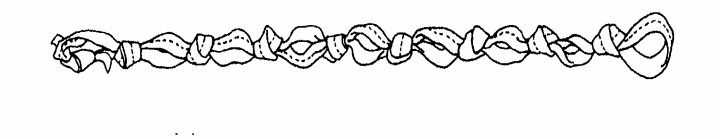
Learning Step/ Activity 2-Inspection and Care:

a. Chocks and related hardware should be inspected before, during, and after use to ensure serviceability. All metal surfaces should be smooth and free of rust, corrosion, dirt, and moisture. Burrs, chips, and rough spots should be filed smooth and wire-brushed or rubbed clean with steel wool. Items that are cracked or warped indicate excessive wear and should be discarded. Moving parts should move freely; lubricate them if needed. Wires should be smooth with no broken strands.

ELO O

ACTION:	Describe the characteristics/maintenance of daisy chains
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of daisy chains IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Daisy Chains



a. Daisy chains are pre-sewn or self-made sings with loops formed by knots or pre-sewn loops 3 to apart used in the same manner as a Fifi hook.

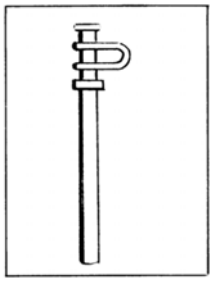
Learning Step/Activity 2 - Inspection and Care:

a. You care for these the same as you would tubular nylon webbing. If pre sewn check stitching. If home made check knots and untie when no in use.

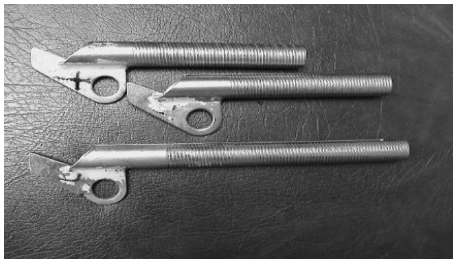
ELO P

ACTION:	Describe the characteristics/maintenance of ice pitons /snargs
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of ice pitons/snargs IAW the NWTC Mountain Operations Manual.

Learning Step/Activity - 1 Ice pitons and Snargs



a. The ice piton is used to establish anchor points. The ice piton is not seen in modern ice climbing but may still be available to the military. The standard ice piton is made of tubular steel and is 10 inches in length. Ice pitons installed in pairs are a bombproof anchor, however, ice pitons have no design feature, such as threads for friction, to hold them in the ice once placed and are removed easily. Safe use of ice pitons requires placement in pairs. Used singularly, these are a strong anchor but easily removed, decreasing the perceived security of the anchor. The effective time/strength for an ice piton placement is limited. The piton will heat from solar radiation or the ice can crack or soften. Solar radiation can be nearly eliminated by covering the piton(s) with ice chips once it has been placed. If repeated use is necessary for one installation such as top roping, you should inspect frequently and relocate when necessary. When an ice piton is removed, the ice that has accumulated in the tube must be removed before it freezes in position, making further use difficult.



Snarg

b. Snargs are a combination of both the ice pitons and the ice screws. They are put in the same as an ice piton but removed like an ice screw.

Learning Step/Activity 2- Inspection and Care

a. Inspection and care of ice pitons is the same as for ice screws

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ELO Q

ACTION:	Describe the characteristics/maintenance of ice screws
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of ice screws IAW the NWTC Mountain Operations Manual.

Learning Step/ Activity 1 -Ice Screws

Ice screws

a. Ice screws are similar to ice pitons but have very deep threads spiraling down the outside of the shaft from sharp starter points on the end opposite the “hanger.” They come in a variety of lengths and styles. Constructed from steel or titanium, contemporary screws are hollow and are the preferred type. Screws are designed to be turned into the ice by hand or tool, but there are others designed to be hammered into position and usually unscrewed to remove, called a pound-in or “snarg.” These are not as secure as the screw in type, (but more secure than the ice pitons), as the threads are very shallow and will not hold a strong direct outward pull; the screw threads are the security in screws. The common length for

both types is 8 inches, although some are produced from 4 to 12 inches in length. These odd lengths have limits on usage- the shorter ones are not as strong and the longer screws require thicker ice for proper insertion

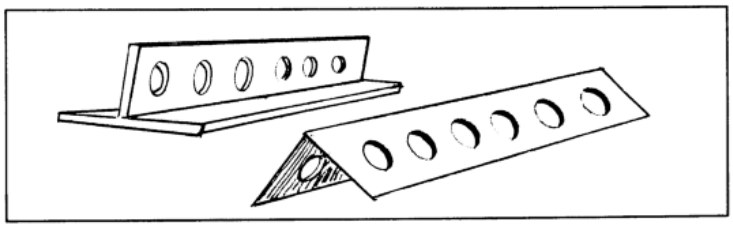
Learning Step/ Activity 2-Inspection and Care

a. The Ice screws, including pitons and snargs, should be inspected for cracks, bends, and other deformities that may impair its strength or function. If any cracks or bends are noticed, the screw should be turned in. A file may be used to sharpen the ice screw points. Steel wool should be rubbed on rusted surfaces and a thin coat of oil applied when storing steel ice screws.

ELO R

ACTION:	Describe the characteristics/maintenance of snow pickets
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of snow pickets IAW the NWTC Mountain Operations Manual.

Learning Step/ Activity 1- Snow Pickets



a. Pickets are stakes made from aluminum angle stock. They are used as snow anchors the same way ice screws are used in ice. Holes are drilled in the pickets for insertion of webbing, rope, or carabiners. The picket is driven into the snow at 5º-15º off perpendicular from the lower surface. If the picket cannot be driven in all the way to the top hole, the carabiner should be placed in the hole closest to the snow surface to reduce leverage. It may also be tied off with a short loop of webbing or rope as in tying off pitons. The picket can be buried as a dead man anchor also.

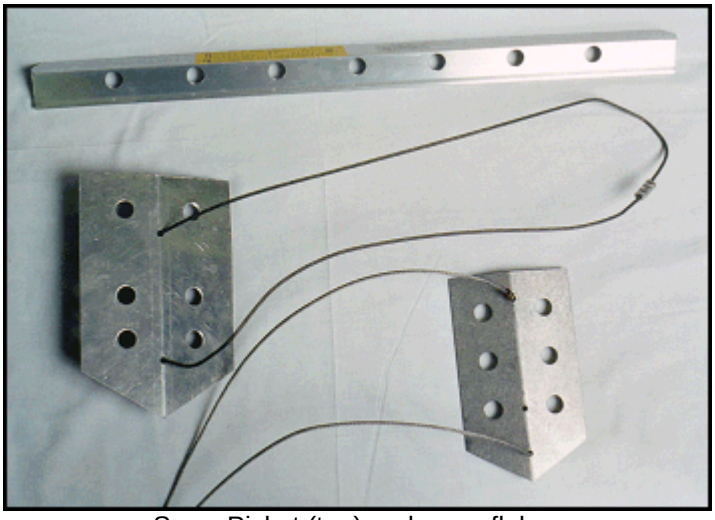
Learning Step/ Activity 2-Inspection and Care

a. The picket should be inspected for bends, chips, cracks, mushrooming ends, and other deformities. The ends should be filed smooth. If bent or cracked, it should be turned in for replacement.

ELO S

ACTION:	Describe the characteristics/maintenance of snow flukes
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics and maintenance of snow flukes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1- Snow Flukes



Snow Picket (top) and snow flukes

a. A snow fluke is used as a dead man anchor in snow. It is constructed from an aluminum plate with holes drilled to reduce weight, and looks like a shovel blade. It normally has a wire cable attached. When placed properly the fluke is designed to bury deeper into the snow under load, however, they tend to "pop-out" if they contact a hard layer underneath. They work best in wet, heavy, springtime snow.

Learning Step/ Activity 2-Inspection and Care

a. The fluke should be inspected for bends, chips, cracks, mushrooming ends, and other deformities. The ends should be filed smooth. If bent or cracked, it should be turned in for replacement. The cable should be inspected for frays and deformed swages.

SECTION IV SUMMARY

Check on Learning

NOTE: Let the students know that these tasks are not tested individual, however will be tested during other tasks

QUESTIONS AND ANSWERS

a. What part of the rope is the mantle?

The sheath of the rope or the outside of the rope.

b. What is the maximum strength of the steel non-locking carabineer (military)?

4000 lbs.

3. How does the soft-iron piton conform to the rocks?

By bending when hammered into the cracks.

4. What can the figure eight also be used for?

As a mechanical belay device

5. What can the mechanical ascender be used in place of?

A prussik knot.

Review and Summarize Lesson

ACTION:	Describe the characteristics, care and maintenance of Mountaineering Equipment
CONDITION:	In a classroom or field environment, with all issued mountaineering equipment and equipment brought by SGL
STANDARD:	Describe the characteristics, care and maintenance of Mountaineering Equipment IAW the NWTC Mountain Operations Manual.

Transition to next lesson

As per the NWTC training schedule; dependent upon the course in conduct.

SECTION V	STUDENT EVALUATION
Testing Requirements	**Students will be tested on this task during the written test as per the NWTC schedule for this course.**
Feedback Requirement	**Students will receive two opportunities to pass each event tested. Re-training will be conducted for students that fail the first iteration of testing. Refer to M020 for specifics.**